IN THE CLAIMS:

Please cancel claims 1-31 without prejudice or disclaimer, and substitute new claims 32-62 therefor as follows:

Claims 1-31 (Cancelled).

32. (New) A process for manufacturing an electrochemical device comprising a cathode, an anode and at least one electrolyte membrane disposed between said anode and said cathode, wherein at least one of the cathode, the anode and the electrolyte membrane, each comprising at least a ceramic material, is produced by the method comprising the steps of:

thermally treating an aqueous solution comprising at least one metal cation, at least one hydrosoluble ethylenically unsaturated monomer with an ester moiety, and a hydrosoluble cross-linking monomer with at least two ethylenically unsaturated ester moieties, to provide a gel and to obtain said at least one metal cation in an oxide form;

calcining said gel to remove organic substances and to form a crystal phase of said at least one metal oxide in a nanosize powder form; and

sintering said powder to provide the ceramic material.

33. (New) The process according to claim 32, wherein the electrochemical device is a solid oxide fuel cell.

34. (New) The process according to claim 32 wherein the anode contains a material selected from:

a cermet material comprising a metallic portion selected from copper, aluminum, gold, praseodymium, ytterbium, cerium, nickel, iron, cobalt, molybdenum, platinum, iridium, ruthenium, rhodium, silver, and palladium, and a ceramic portion selected from yttria-stabilized zirconia, ceria doped with gadolinia or samaria, and $La_{1-x}Sr_xGa_{1-y}Mg_yO_{3-\delta}$ wheren x and y are 0 to 0.7, and δ is from stoichiometry; and

a ceramic material selected from cerium oxide, manganese oxide, molybdenum oxide, titania, ceria doped with gadolinia or samaria, niobia-doped ceria, and perovskites.

35. (New) The process according to claim 32, wherein the electrolyte membrane contains a ceramic material selected from yttria-stabilized zirconia, ceria doped with gadolinia or samaria, and $La_{1-x}Sr_xGa_{1-y}Mg_yO_{3-\delta}$ wherein x and y are 0 to 0.7, and δ is from stoichiometry.

36. (New) The process according to claim 32, wherein the cathode contains a material selected from oxides of rare earth elements, peroviskites, optionally in combination with a doped ceria, and mixtures thereof.

37. (New) The process according to claim 32, wherein the aqueous solution comprises water or water with at least one hydrosoluble solvent.

38. (New) The process according to claim 37, wherein the hydrosoluble solvent is selected from an alcohol, glycol, tetrahydrofuran, and dioxane.

39. (New) The process according to claim 32, wherein the at least one metal cation is selected from lanthanum, strontium, chromium, zirconium, yttrium, aluminium, lithium, antimony, boron, cadmium, cerium, cobalt, copper, dysprosium, erbium,

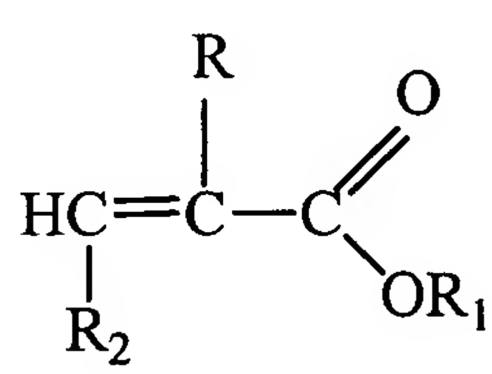
europium, gallium, gold, hafnium, holmium, iridium, iron, lutetium, manganese, molybdenum, nickel, niobium, osmium, palladium, platinum, praseodymium, rhenium, rhodium, rubidium, ruthenium, samarium, scandium, silver, sodium, tantalum, terbium, thorium, thulium, tin, titanium, tungsten, uranium, vanadium, and ytterbium cations.

40. (New) The process according to claim 32, wherein the at least one metal cation solution is obtained by dissolving a hydrosoluble precursor selected from oxides, chlorides, carbonates, β-diketonates, hydroxides, nitrates, acetates, oxalates, and mixtures thereof.

41. (New) The process according to claim 32, wherein, in the aqueous solution, the at least one metal cation is in a concentration higher than 0.5 mol/l.

42. (New) The process according to claim 41, wherein, in the aqueous solution, the at least one metal cation is in a concentration of 1 to 10 mol/l.

43. (New) The process according to claim 32, wherein the hydrosoluble ethylenically unsaturated monomer has general formula (I)



(I)

wherein R is hydrogen, (C_1-C_4) alkyl, aryl or aryl (C_1-C_4) alkyl; R_1 is a C_1-C_8 hydrocarbon group containing at least one polar group selected from -COOH, $-NH_2$, -NHR', $-N(R')_2$, -OH, -OR', $-SO_3H$, or -SH, wherein R' is a (C_1-C_6) alkyl group; and R_2 is hydrogen, methyl, ethyl, propyl or phenyl.

44. (New) The process according to claim 43, wherein R' is a (C_1-C_4) alkyl group.

45. (New) The process according to claim 43, wherein the ethylenically unsaturated monomer is selected from 2-hydroxyethyl acrylate, 2-hydroxypropyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, 2-hydroxyethyl phenacrylate, hydroxybutyl acrylate, hydroxybutyl methacrylate, butandiol monoacrylate, 2-(2-ethoxyethoxy) ethyl acrylate, diinethylamino ethyl acrylate, and dimethylamino ethyl methacrylate.

46. (New) The process according to claim 32, wherein the cross-linking. monomer is selected from diacrylates and triacrylates wherein acrylate groups are linked to alkoxylated moieties or polyoxyalkylene linear units.

47. (New) The process according to claim 46, wherein the cross-linking monomer is polyethyleneglycol diacrylate or ethoxylated trimethylolpropanetriacrylate.

48. (New) The process according to claim 32, wherein the aqueous solution comprises a hydrosoluble polymerization initiator.

49. (New) The process according to claim 48, wherein the hydrosoluble polymerization initiator is α, α'-azaisobutyronitrile (AIBN), tetramethylene-ethylenediamine, hydrogen peroxide, benzoyl peroxide, dicumyl peroxide, ammonium, sodium or potassium persulfate.

50. (New) The process according to claim 32, wherein the thermal treatment is effected at a temperature of 50°C to 150°C.

51. (New) The process according to claim 32, wherein before proceeding to the calcining step, the gel is dried to obtain a xerogel.

52. (New) The process according to claim 51, wherein the gel is dried at a temperature of 80°C to 300°C.

53. (New) The process according to claim 51, wherein the xerogel is disaggregated and subjected to the calcining step.

54. (New) The process according to claim 32, wherein the calcining step is carried out at a temperature of about 300°C to about 1500°C.

55. (New) The process according to claim 32, wherein the calcining step is carried out by progressively increasing temperature.

56. (New) The process according to claim 32, wherein at least one grinding step of the powder is carried out at an intermediate stage of the calcining step.

57. (New) The process according to claim 32, wherein the nanosize powder has a mean primary grain size lower than 20 nm.

58. (New) The process according to claim 57, wherein the nanosize powder has a mean primary grain size of 3 nm to 15 nm.

59. (New) The process according to claim 32, wherein a reduction step is effected together with the sintering step.

60. (New) The process according to claim 59, wherein the reduction step is effected under hydrogen atmosphere.

61. (New) The process according to claim 32, wherein the sintering of the nanosize powder is preceded by a shaping step to shape the nanosize powder in form of an anode, cathode or electrolyte membrane for an electrochemical device.

62. (New) A process for manufacturing a nanosize oxide powder, the process comprising the steps of:

thermally treating an aqueous solution comprising at least one metal cation, at least one hydrosoluble ethylenically unsaturated monomer with an

ester moiety, and a hydrosoluble cross-linking monomer with at least two ethylenically unsaturated ester moieties, to provide a gel and to obtain said at least one metal cation in an oxide form; and

calcining said gel to remove organic substances and to form a crystal phase of said at least one metal oxide in nanosize powder form.